

CM WHAT IS CLAIMED IS:

1. A cardiac pacemaker including means for variably controlling the stimulation rate of the heart according to the level of muscular exertion in the body, comprising:

a temperature sensing means for sensing a non-ambient body temperature, said non-ambient body temperature related by an algorithm to heart rate in a normally functioning heart, said temperature sensing means producing an output signal;

an algorithm implementing means connected to said temperature sensing means for implementing said output signal by an algorithm which represents the mathematical function between said non-ambient body temperature and heart rate in a normally functioning heart; and

a cardiac pacemaker connected to said algorithm implementing means and responsive thereto in order to variably control the stimulation rate of said heart.

2. The cardiac pacemaker of claim 1, wherein said algorithm implementing means output signal is variable between a maximum and minimum level corresponding to or within the desired maximum and minimum levels of heart rate in a normally functioning heart.

3. The cardiac pacemaker of claim 2, wherein said temperature sensing means senses blood temperature.

4. The cardiac pacemaker of claim 3, wherein said temperature sensing means senses venous blood temperature in the right ventricle of said heart.

5. The cardiac pacemaker of claim 4, wherein said algorithm implementing means is programmable by telemetry after said cardiac pacemaker is implanted in said body.

6. The cardiac pacemaker of claim 5, wherein said temperature sensing means includes a thermister, a thermocouple, a semiconductor junction or an optical liquid crystal temperature sensor.

7. A method for variably controlling the stimulation rate of the heart according to the level of muscular exertion in a body, comprising the steps of:

a) measuring the temperature at a desired location within said body at which location the temperature is a non-ambient body temperature which is related to heart rate in a normally functioning heart by an algorithm; and

b) controlling a cardiac pacemaker by said measured temperature so as to cause said cardiac pacemaker to provide electrical stimulation to a heart at a rate which is related by said algorithm to the temperature measured.

8. The method of claim 7, wherein step (a) includes inserting a temperature sensing means within the blood stream in order to sense blood temperature.

9. The method of claim 8, wherein step (a) includes inserting said temperature sensing means via a catheter within the right ventricle of said heart in order to sense venous blood temperature.

Sub-B → 10. A catheter-based sensor and stimulus means for an exercise responsive cardiac pacemaker including pacing circuitry for providing electrical stimulation of a heart based upon the level of muscular exertion, comprising:

a sensor means for sensing blood temperature;

a stimulus means for applying an electrical stimulus to a heart; and

a catheter associated with said sensor means and said stimulus means, said catheter having a at least one lumen therethrough through which said sensor means and said stimulus means are adapted to be operatively connected to control circuitry for said exercise responsive cardiac pacemaker in such manner that the frequency of said electrical stimulus is controlled by said blood temperature as sensed by said sensor means.

11. The apparatus of claim 10 wherein said stimulus means is mounted on the distal end of said catheter and said sensor means is received within said lumen.

12. The apparatus of claim 11 wherein said sensor means is located relative to said stimulus means such that when said stimulus means is positioned within said heart for electrical stimulation thereof, said sensor means is positioned within the right ventricle of said heart.

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13. The apparatus of claim 12 wherein said catheter includes first, second and third lumens, [said first lumen for operatively coupling therethrough said stimulus means with said control circuitry, and said second and third lumens for operatively coupling therethrough said sensor means and said control circuitry.]

14. The apparatus of claim 13 wherein said sensor means is a thermister and said stimulus means is an electrode.

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